

WHAT IS CLAIMED IS:

1. A semiconductor device comprising a laminate structure in which an organic insulating film is formed in close contact with a hydrophobic surface of an inorganic insulating film including silicon and nitrogen.

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2. A semiconductor device, comprising:

an inorganic insulating film having a hydrophobic surface and including silicon and nitrogen on a semiconductor layer; and

an organic insulating film formed in close contact with a hydrophobic surface
10 of the inorganic insulating film.

3. A semiconductor device, comprising:

a first inorganic insulating film on a semiconductor layer;

a second inorganic insulating film having a hydrophobic surface and including
15 silicon and nitrogen on the first inorganic insulating film; and

an organic insulating film formed in close contact with a hydrophobic surface
of the second inorganic insulating film.

4. A semiconductor device according to Claim 3, wherein hydrogen
20 concentration in the second inorganic insulating film is higher than hydrogen concentration in the first inorganic insulating film.

5. A semiconductor device according to Claim 1, wherein the hydrophobic surface has a contact angle of water of equal to or more than 30°.

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6. A semiconductor device according to Claim 2, wherein the hydrophobic surface has a contact angle of water of equal to or more than 30°.

7. A semiconductor device according to Claim 3, wherein the hydrophobic surface has a contact angle of water of equal to or more than 30°.

8. A semiconductor device according to Claim 1, wherein the hydrophobic surface has a contact angle of water of equal to or more than 40°.

9. A semiconductor device according to Claim 2, wherein the hydrophobic surface has a contact angle of water of equal to or more than 40°.

10. A semiconductor device according to Claim 3, wherein the hydrophobic surface has a contact angle of water of equal to or more than 40°.

11. A semiconductor device according to Claim 1, wherein the inorganic insulating film or the second inorganic insulating film includes oxygen and the nitrogen of equal to or more than 25 atom%.

12. A semiconductor device according to Claim 2, wherein the inorganic insulating film or the second inorganic insulating film includes oxygen and the nitrogen of equal to or more than 25 atom%.

13. A semiconductor device according to Claim 3, wherein the inorganic insulating film or the second inorganic insulating film includes oxygen and the nitrogen

of equal to or more than 25 atom%.

14. A semiconductor device according to Claim 1, wherein the inorganic
insulating film or the second inorganic insulating film is a silicon nitride film or a
5 silicon nitride oxide film.

15. A semiconductor device according to Claim 2, wherein the inorganic
insulating film or the second inorganic insulating film is a silicon nitride film or a
silicon nitride oxide film.
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16. A semiconductor device according to Claim 3, wherein the inorganic
insulating film or the second inorganic insulating film is a silicon nitride film or a
silicon nitride oxide film.

15 17. A semiconductor device according to Claim 1, wherein the organic
insulating film includes one of or a plurality of organic resin materials selected from
acrylic resin, polyamide, or polyimide of photosensitive or nonphotosensitive, for
example.

20 18. A semiconductor device according to Claim 2, wherein the organic
insulating film includes one of or a plurality of organic resin materials selected from
acrylic resin, polyamide, or polyimide of photosensitive or nonphotosensitive, for
example.

25 19. A semiconductor device according to Claim 3, wherein the organic

insulating film includes one of or a plurality of organic resin materials selected from acrylic resin, polyamide, or polyimide of photosensitive or nonphotosensitive, for example.

5 20. A method for manufacturing a semiconductor device, comprising the steps of:

forming a first inorganic insulating film on a semiconductor layer;

heat-treating at a temperature of from 400°C to 500°C;

forming a second inorganic insulating film having a hydrophobic surface and

10 including silicon and nitrogen on the first inorganic insulating film; and

forming an organic insulating film on the second inorganic insulating film.

21. A method for manufacturing a semiconductor device, comprising the steps of:

15 forming a first inorganic insulating film containing hydrogen on a semiconductor layer;

reducing a hydrogen content in the inorganic insulating film by heat-treating at a temperature of from 400°C to 500°C;

forming a second inorganic insulating film having hydrophobic surface and

20 including silicon and nitrogen on the first inorganic insulating film; and

forming an organic insulating film on the second inorganic insulating film.

22. A method for manufacturing a semiconductor device according to Claim 20, wherein the organic insulating film is formed of a photosensitive organic insulating
25 film.

23. A method for manufacturing a semiconductor device according to Claim 21, wherein the organic insulating film is formed of a photosensitive organic insulating film.

5 24. A method for manufacturing a semiconductor device according to Claim 20, wherein the hydrophobic surface is formed to have a contact angle of water of equal to or more than 30°.

 25. A method for manufacturing a semiconductor device according to Claim 21,
10 wherein the hydrophobic surface is formed to have a contact angle of water of equal to or more than 30°.

 26. A method for manufacturing a semiconductor device according to Claim 20,
wherein the hydrophobic surface is formed to have a contact angle of water of equal to
15 or more than 40°.

 27. A method for manufacturing a semiconductor device according to Claim 21,
wherein the hydrophobic surface is formed to have a contact angle of water of equal to
or more than 40°.

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 28. A method for manufacturing a semiconductor device according to Claim 20,
wherein the inorganic insulating film or the second inorganic insulating film is formed
to include oxygen and the nitrogen of equal to or more than 25 atom%.

25 29. A method for manufacturing a semiconductor device according to Claim 21,

wherein the inorganic insulating film or the second inorganic insulating film is formed to include oxygen and the nitrogen of equal to or more than 25 atom%.

30. A method for manufacturing a semiconductor device according to Claim 20,
5 wherein the hydrophobic surface is formed by nitrogen plasma treatment or fluorine plasma treatment with a non-depositional gas.

31. A method for manufacturing a semiconductor device according to Claim 21,
wherein the hydrophobic surface is formed by nitrogen plasma treatment or fluorine
10 plasma treatment with a non-depositional gas.

32. A method for manufacturing a semiconductor device according to Claim 30,
wherein the hydrophobic surface is formed with one of or a plurality of
non-depositional gases selected from N_2O , N_2 , NH_3 , F_2 , CF_4 , or SiF_4 .

15 33. A method for manufacturing a semiconductor device according to Claim 31,
wherein the hydrophobic surface is formed with one of or a plurality of
non-depositional gases selected from N_2O , N_2 , NH_3 , F_2 , CF_4 , or SiF_4 .

20 34. A method for manufacturing a semiconductor device according to Claim 20,
wherein the organic insulating film is formed to include one of or a plurality of organic
resin materials selected from acrylic resin, polyamide, or polyimide of photosensitive or
nonphotosensitive, for example.

25 35. A method for manufacturing a semiconductor device according to Claim 21,

wherein the organic insulating film is formed to include one of or a plurality of organic resin materials selected from acrylic resin, polyamide, or polyimide of photosensitive or nonphotosensitive, for example.

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